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ABSTRACT

This paper describes the Grolier Publishing Company's development of its encyclopedic text database by editing the machine-readable data files from which the Academic American Encyclopedia was printed, and its longer-term objective of creating a multimedia encyclopedia when the technology for a viable delivery system becomes available. Topics discussed include the role and the limitations of print encyclopedias; the limitations of electronic media; the enhancement of encyclopedia information in electronic media; and future plans for an audiovisual database. A simulated information search is presented in 17 figures depicting the screen on an Apple Macintosh computer at different stages of the search. (EW)

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Multimedia Technology

An Encylopedia Publisher's Perspective

Peter Cook
Grolier

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Among the dozen or so companies, individuals, and educational organizations represented at Apple's "Multimedia in Education" seminar, Grolier occupied a unique position and—we believe—offered a unique perspective. Grolier is not a computer manufacturer, software developer, university research lab, or not-for-profit organization; it is a publicly traded international publisher that is very heavily involved in one particular information-delivery technology, a technology that has remained remarkably stable throughout its long history: the publishing of printed books. It is a technology that we know intimately in terms of the creative/editorial process, the production and manufacturing, and the marketing and distribution of the end products—products that meet a real need in a particular market or market segment.

Because print technology is so stable, and the market forces that create the demand for print products (particularly within the education market) are well defined, print publishers have little incentive to pursue ill-defined alternative delivery technologies, with all their associated risks and uncertainties. In fact, publishers who are used to working in product life cycles of 5, 10, and—in the case of encyclopedias—20 years or more, are often confused by the rapid and apparently helter-skelter development and introduction of new hardware devices and new software delivery media.

Given all of the above, perhaps this question should be asked: Why should an encyclopedia publisher such as Grolier—a representative of the most traditional, unchanging segment of print publishing—be interested in multimedia technology in the first place?

A simple answer would be that any information-delivery technology that is *viable* for Grolier's products and markets is viewed as a potential business opportunity, and as a possible threat to the company's current business. I could go on at great length outlining the nature of both the opportunities and the threats that face traditional print publishers, but I want to step back from that discussion and instead look at the impact of information technologies on society as a whole, so that Grolier's longer-term strategy, and its view of multimedia technology in particular, can be seen in a broader context.

Grolier has elected to ride the wave of technology because—from our publishing perspective—there is no other sensible alternative. We are in the information business, and the mode for disseminating information of all forms—data, text, audio, visual—is undergoing rapid change, in terms of both the media of dissemination and the relative importance of the various kinds of media.

Print publishers today must compete with other media for valuable time and resources, as we move from a predominantly paper-based to a screen-based society. In some areas of life, that transition is already accomplished: television is the medium of greatest influence on much of modern society—children in the U.S. are already exposed to a staggering 6–7 hours of TV viewing per day. Television is a seductive medium: the illusion of reality created by its images; the passive, relaxing nature of the viewing experience; the strengthening of family bonds through sharing the experience—no matter how slight; each of these factors is a powerful reinforcer of the dominance of television in our lives.

Computer technology (at least as viewed by the end user who has little understanding or interest in the underlying technology) is also screen based, but, because it cannot function without interaction, it is the antithesis of television, which is passive by nature. The value of the computer lies in its ability to manipulate many kinds of information under the control of the user, information that already exists as published software (from adventure games to physics simulations) and information that is entered directly by the user into a software tool (such as a word processor or a data-base manager). In an educational setting, it is the user's interaction with the content of a computer program, in particular the degree of personal control of the information exchange, that sets the computer apart. Interaction requires involvement, which in turn can enhance the learning experience.

Television, or more correctly, the video medium, is already all-pervasive in our society. Computers, particularly personal computers, have already changed many aspects of our working lives and will ultimately become as prevalent in schools and homes. The domains of television and computer technology are beginning to converge, and early examples of this convergence, such as interactive videodisc, demonstrate some of the potential of multimedia products. Such products allow the user to interact with video and audio information, selecting individual pathways through the program and controlling the pace of the information displayed.

Computer-controlled videodisc players are already being used to great effect in meeting the training requirements of large corporations, and a few educational programs have recently been introduced into schools (for example, the *Core Concepts in Science and Math* series, produced by Systems Impact, Inc). But the videodisc/computer systems of the present are frequently hardware hybrids that do not effectively integrate the audiovisual materials with those generated by the computer. Future systems will combine all functions in a single hardware device, providing true multimedia capabilities.

But what are the potential advantages of such systems? We believe that multimedia products will break down the barriers that currently exist between the worlds of print publishing, film and television production, and computer technology, providing a hardware system and a delivery medium that can blend materials from all sources. If this potential is fully realized, multimedia delivery systems could provide us with exciting new tools for working, learning, and entertainment.

Grolier's Strategy for Building a Multimedia Encyclopedia

Having outlined a somewhat seductive vision of the future potential for multimedia products—with the underlying promise of the business opportunities created by such products—I will now return to the present, and even refer to the past, as I outline Grolier's goals and the strategy for implementing those goals.

One of the company's longer-term objectives is the creation of a multimedia encyclopedia, an information tool for the 1990s and beyond. However, it is a product concept that cannot be delivered via current technology; nor, we believe, would the market be ready for it even if a truly viable delivery technology were available today. Our strategy, therefore, is to build toward that long-term goal through a series of product-development stages that are acceptable in strict business terms and that are providing the building blocks for our longer-term goal.

Because current technology cannot provide us with a viable delivery system for multimedia products, our development plan has two tracks—one for the *development of an encyclopedic text data base* and the other for the *development of of an audiovisual data base* —but it is our firm belief that both tracks will converge and eventually merge into one. It is not prudent for any company to base its business decisions on future events that it has little control over, but we believe that our step-by-step development plan minimizes the current business risk while still building toward the long-term goal.

Developing an Encyclopedic Text Data Base

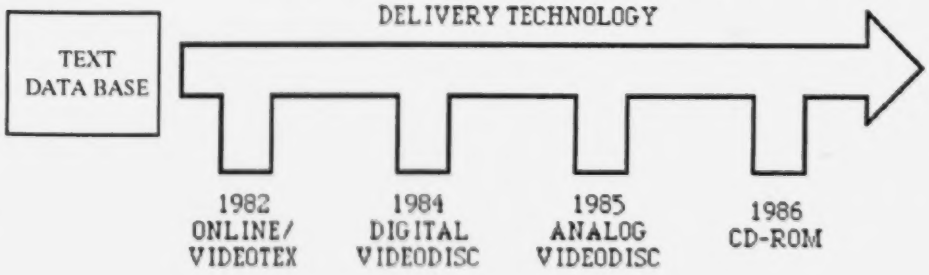
The decision to develop and market an electronic edition of an encyclopedia was greatly facilitated by Grolier's acquisition of the Academic American Encyclopedia (AAE), a 20-volume, 9-million-word general reference set that was first published in 1980. Although the AAE had been developed as a print product, all of the text had been typeset using computer technology. The entire text existed as a machine-readable data base that was subsequently edited to eliminate nondisplayable characters as well as all references to the illustrations that are used in the print edition.

The data base was made commercially available in 1982 via Dow Jones News/Retrieval, and is now accessible to over 700,000 subscribers via some 12 additional on-line services, including CompuServe, The Source, Dialog, and BRS.

The on-line business is a viable one for Grolier. It's a business that will grow as the networking of computers continues to expand within the business and educational markets. It has also provided the company with a tremendous learning experience—particularly in terms of how different audiences, from young children to business users, access and use an electronic encyclopedia. We found, for example, that information searches were frequently frustrated by the unforgiving nature of the retrieval software programs—the interface between the user and the data base—that are used by the various on-line services. For example, the software of relatively easy-to-use systems such as CompuServe cannot handle slight misspellings or word transpositions in search terms entered by users, and the more powerful, professional services require a considerable understanding of the complex command language used by their software. Through this experience we realized the underlying importance of retrieval software, and how it can be adapted to better suit the needs of the encyclopedia user and to more fully realize the power of electronic media—issues that will be addressed later in this paper.

Our experience with on-line distribution of the data base has been helpful in other projects using various forms of optical storage as the delivery media. In 1984, Grolier worked with Laserdata Inc. to develop a prototype laser videodisc that stored the text of the AAE as digital data. That work was followed a year later by the commercial introduction of the *Knowledgedisc*, an analog videodisc edition of the AAE, and in 1986 by the introduction of *The Electronic Encyclopedia* , a CD-ROM edition of the same data base—both of these products were developed with KnowledgeSet Inc. (formerly known as Activenture).

The Encyclopedia Text Data Base: Development Steps



All of these developments have been viable in purely business terms, and each has been of significant value to the ongoing development and refinement of the data base. The text data base has in fact diverged considerably from its print parent: more articles have been added because, unlike the print edition, the electronic data base has no physical limitations. The electronic edition is also more current, with the on-line version being updated on a quarterly basis compared to the annual update of the printed set.

With the CD-ROM edition, we have also considerably enhanced the retrieval software, addressing many of the limitations of on-line services mentioned earlier. The success of a new distribution medium such as CD-ROM lies in its ability to be much more than a direct physical substitution for other delivery technologies. We have acknowledged that fact in developing the various editions of the data base, adding value to the information in ways that are not possible with the printed work.

Later in this paper, I will be reviewing how text information can be enhanced, but these enhancements are best explained by first examining how print encyclopedias are used, and then showing, through examples, how an electronic encyclopedia can better serve these same information needs.

The Role of a Print Encyclopedia

The primary role of a general encyclopedia is that of a reference source—a fact-finder—that is designed to meet many kinds of basic information needs across all fields of inquiry. In attempting to encompass all areas of knowledge (the circle of learning embodied in the word "encyclopedia"), the information contained within a general reference set must be carefully selected, and then distilled down to its essence. There are clear variables that affect this process: the physical capacity of the encyclopedia, in terms of words, pages, and illustrations; the targeted audience; the biases and skills of the many individuals who contribute to such a work; and the publisher's commitment to maintaining the currentness and effectiveness of the encyclopedia over time.

The ongoing value of encyclopedias continues to be that they are a microcosm of all knowledge—works that encompass all fields of human endeavor and experience in a convenient resource (though convenient is a relative term if you are working with a 30-volume set). In an age of increasing specialization in both the educational system and the work environment, encyclopedias endure as one of the few remaining sources of general information.

When seeking information in an encyclopedia, the user usually has a certain set of expectations about the work, in terms of how it is organized, the approximate range of the articles it contains, and the limited nature of its content (limited is also a relative term: a 10,000-word article on the American Revolution may be perfectly adequate for a 5th grader but inadequate for a college graduate). These expectations are ultimately either satisfied or not by the success of the encyclopedia in meeting the user's information needs, both in the primary role as a source of basic reference information, and as a vehicle for stimulating the user's curiosity to explore additional information within or beyond the encyclopedia.

Because their primary role is that of a reference tool, printed encyclopedias have been designed to facilitate information seeking. The alphabet is a powerful organizer (as we all know from our use of indexes, dictionaries, telephone books, and so on) and it is the method of organization used most frequently by general encyclopedias—you look in the N volume for articles on New York, and the C volume for information on California. (This convenient yet arbitrary arrangement of information can create some fascinating juxtapositions: Alvar Aalto, the aardvark, and Hank Aaron have almost nothing in common other than the double *a* in their spelling that's responsible for their proximity to each other in an encyclopedia. Yet this method of organization has a value, if only for the serendipitous discoveries it encourages.)

There is also an underlying organization that binds the alphabetically arranged articles to other topically related information. This is achieved within encyclopedia articles by the use of *cross-references* and *see-also listings*, which direct the user to related information elsewhere in the set, and through the use of the *index*, which usually contains listings under convenient topic headings. However, these devices for directing the user to topically related information do not eliminate the awkwardness of alphabetical organization of the information. For example, a child who wanted to see all of the articles on dinosaurs in the AAE would have to access 13 different volumes.

Limitations of Print Media

Clearly, a printed encyclopedia is limited because of the physical constraints of the print medium. The information on its pages remains fixed and cannot be dynamically rearranged to suit the needs and convenience of the end user. And of course the information cannot be updated or changed—short of writing directly onto the margins of the printed page. But printed encyclopedias have yet another limitation that is particularly relevant when one considers the encyclopedia's primary role as a reference source, and that is the inaccessibility of much of the information. For example, to find information on Mark Twain in the AAE, a user could either access the T volume directly, and turn to the article "Twain, Mark," or use the index volume. The AAE index lists six references to articles on Twain—the one principal article and five additional articles that have been selected by the indexer. In fact, a search of the electronic edition of the AAE reveals references to some 25 articles that are of relevance to Twain. The printed index is limited by size and the selection criteria of the indexer, and cannot direct the user to all the relevant information.

However, the printed encyclopedia has one advantage over the current electronic editions: it contains several thousand illustrations—photographs, maps, paintings, diagrams, etc.—none of which can be stored and distributed economically using the electronic distribution media described so far. But as previously stated, we plan to develop a complementary audiovisual encyclopedic data base, using the full range of audiovisual media to deliver an information experience that goes far beyond the fixed images of the printed book. I will describe this in a later section.

The next several pages of this paper show how a text-only electronic edition of the AAE can overcome many of the limitations of the printed encyclopedia, while also providing other enhancements that clearly demonstrate the ability to add value to preexisting information through electronic manipulation.

Limitations of Electronic Media

Before reviewing the advantages of an electronic edition of an encyclopedia, it would be useful to examine some of its inherent disadvantages when compared to a book. First, the computer screen can provide only the most myopic view of a large textual information resource, because a standard computer monitor displays approximately 300 words on the screen at a time, while a print encyclopedia can present *3,000* words across two facing pages. Because of its physical nature, the printed work can also provide a sense of scale and a sense of place: at the most basic level, everyone knows how to navigate in a book. An electronic encyclopedia cannot duplicate the physical dimensions and characteristics of the book; it requires a different set of navigational aids, and a completely different mode of interaction, as the following series of examples will demonstrate.

Enhancing Encyclopedia Information in Electronic Media

The illustrations and examples used in this section show how one particular information quest can be aided by computer technology. It is assumed in the description that the reader is reasonably familiar with the user-interface conventions of Apple's Macintosh computer, in particular with the use of pull-down menus and the selection of options with a mouse.

In this simulated example, information in the encyclopedia data base can be located by direct searching or by browsing, using the various program options. In the first screen (Fig. 1), the user selects the encyclopedia data base from a "library" of reference tools, and chooses the mode of searching. Search options include the ability to search the encyclopedia by individual word, by article title, or by topic area. This particular example begins with the user typing in the article title "Mark Twain" and then clicking on "Search" (Fig. 2). Having found an article that exactly matches the user's request, the computer employs a split-screen technique to display an outline of the article's contents alongside the first "page" of text (Fig. 3). The user can then select any section of the article from the contents listing and view that directly, or remove the contents list (by clicking on the close box) so that the full screen of text can be displayed (Fig. 4).

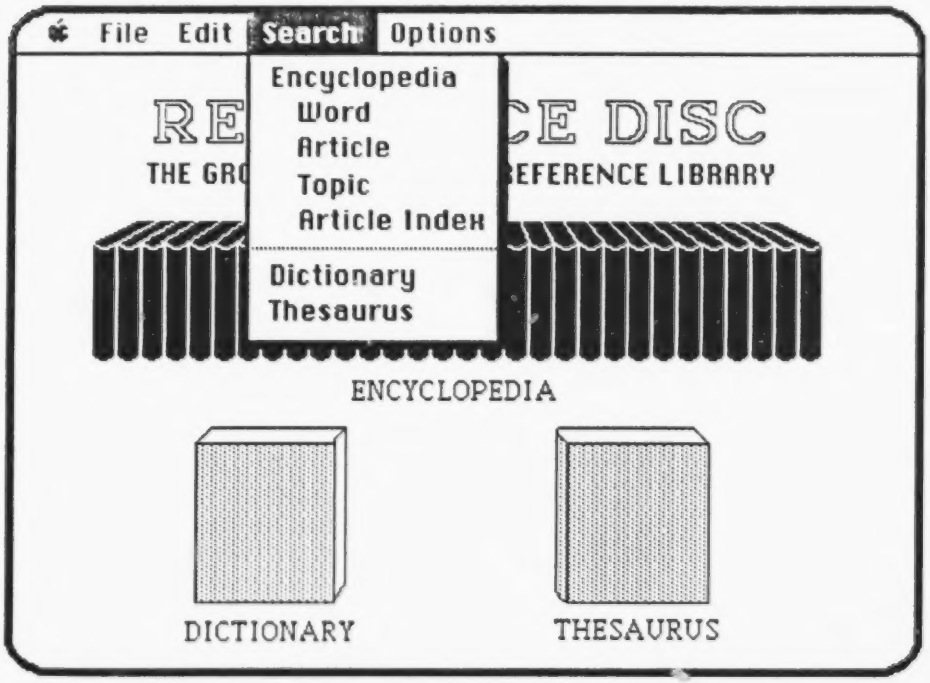


Figure 1

Figure 2

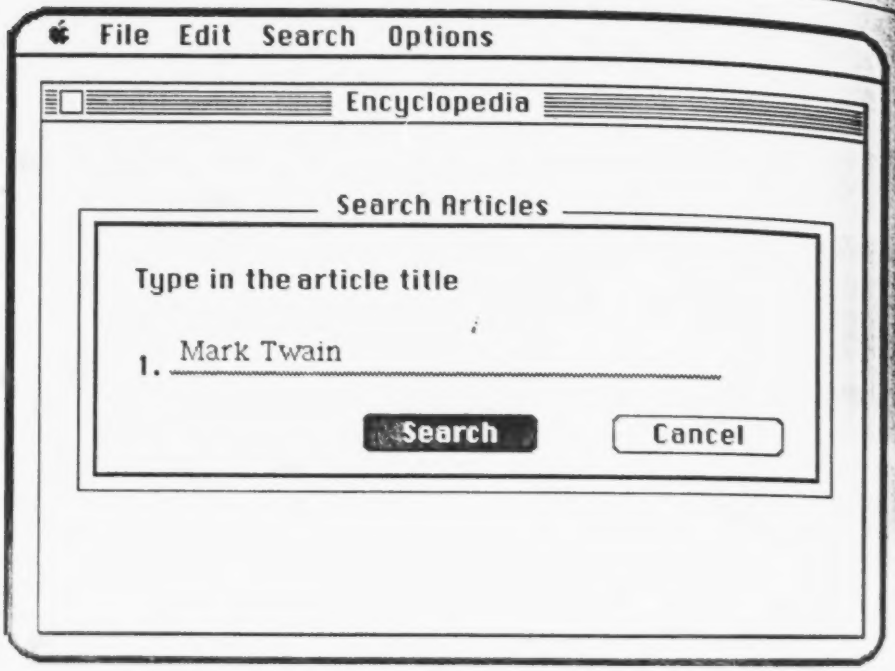
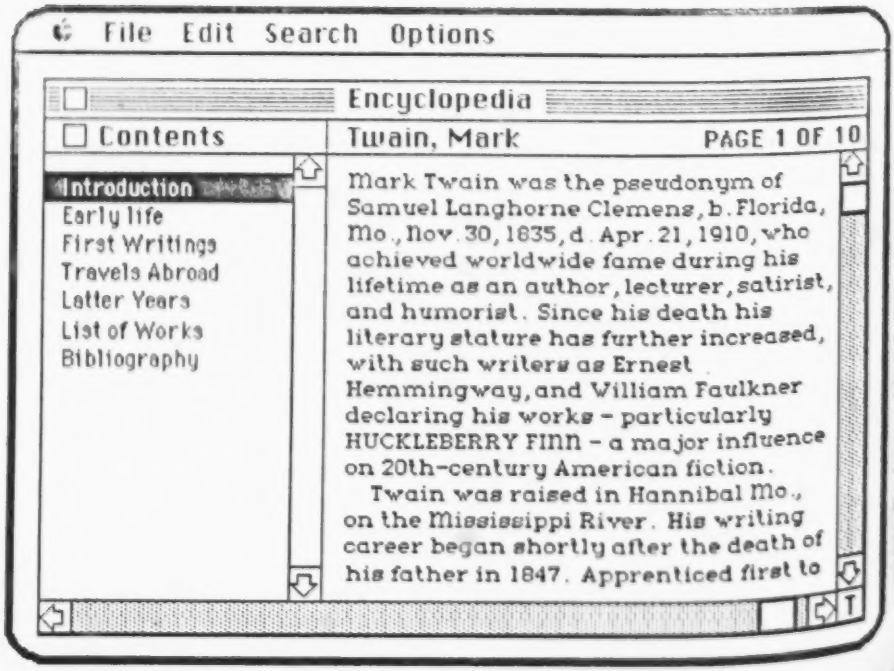


Figure 3


File Edit Search Options
Encyclopedia
Contents
Twain, Mark
PAGE 1 OF 10
Introduction
Early life
First Writings
Travels Abroad
Latter Years
List of Works
Bibliography
Mark Twain was the pseudonym of Samuel Langhorne Clemens, b. Florida, Mo., Nov. 30, 1835, d. Apr. 21, 1910, who achieved worldwide fame during his lifetime as an author, lecturer, satirist, and humorist. Since his death his literary stature has further increased, with such writers as Ernest Hemmingway, and William Faulkner declaring his works - particularly HUCKLEBERRY FINN - a major influence on 20th-century American fiction.
Twain was raised in Hannibal Mo., on the Mississippi River. His writing career began shortly after the death of his father in 1847. Apprenticed first to

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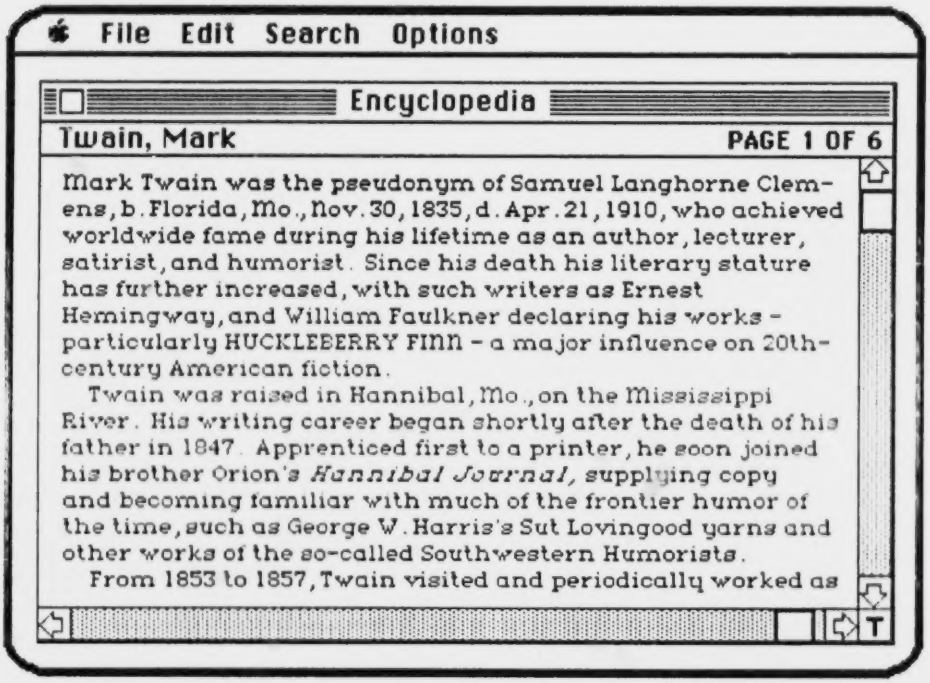
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Twain, Mark
PAGE 1 OF 6
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From 1853 to 1857, Twain visited and periodically worked as
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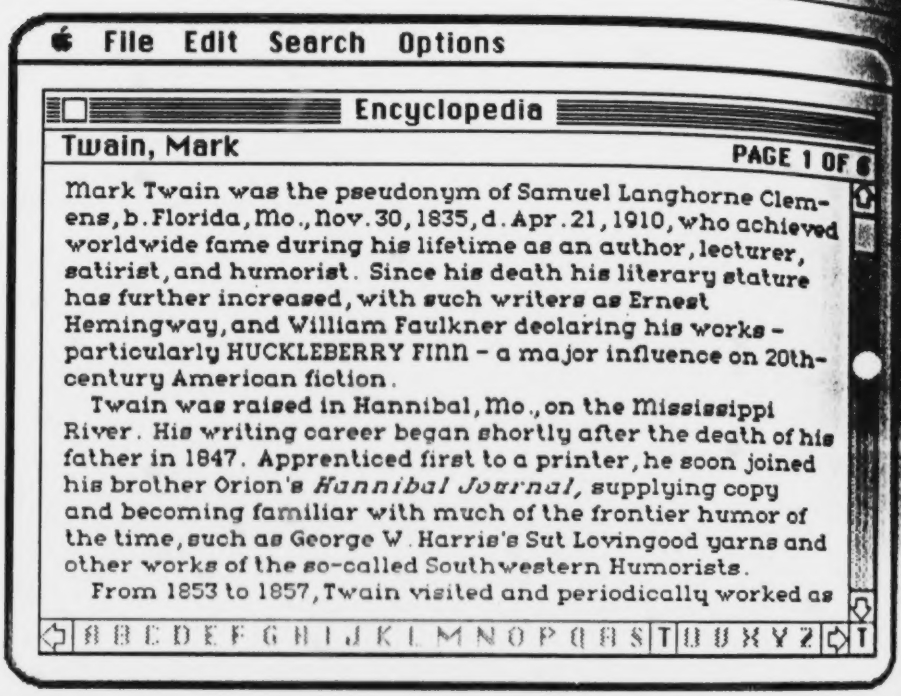
The vertical scroll bar can be used to view additional lines or pages of the article (the "page" convention is based on the portion of the article that is currently in view, hence the different number of pages listed for the same article in Figures 3 and 4). The horizontal scroll bar can be used to browse to articles that are adjacent to Twain in the alphabet, and it is possible to browse through different letters (volumes) of the alphabet by clicking on the current letter (Fig. 5), which changes the scroll bar into an alphabet from which other letters can be selected.

Figure 5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Twain, Mark
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From 1853 to 1857, Twain visited and periodically worked as
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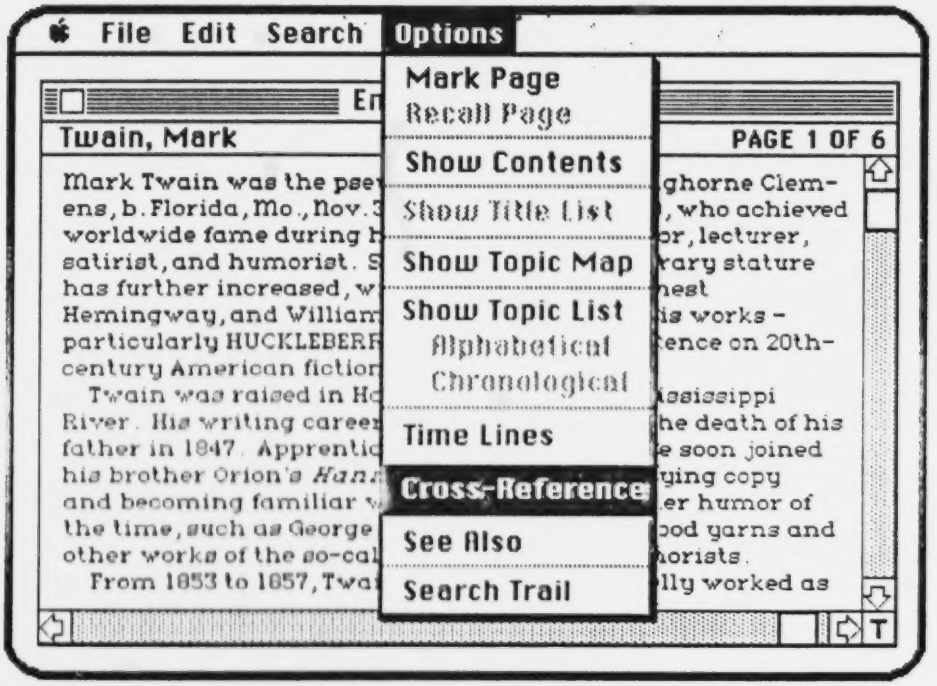
When viewing the text, there are a number of options available to the user, as the Options menu shown in Figure 6 indicates. These include the ability to mark and recall a specific page, to show the table of contents of an article, and to use a feature called "Search Trail," which automatically creates a list of all the articles viewed by the user during a single session with the computer. Other options will be explained through examples. The "Cross-Reference" option that is highlighted in Figure 6 enables the user to select a relevant cross-reference within the text (identified through the familiar book convention of capitalized letters) and then view the relevant article directly using a horizontal split screen (Fig. 7).

Figure 6


File Edit Search Options
Mark Page
Recall Page
Show Contents
Show Title List
Show Topic Map
Show Topic List
Alphabetical
Chronological
Time Lines
Cross-Reference
See Also
Search Trail
Twain, Mark
PAGE 1 OF 6
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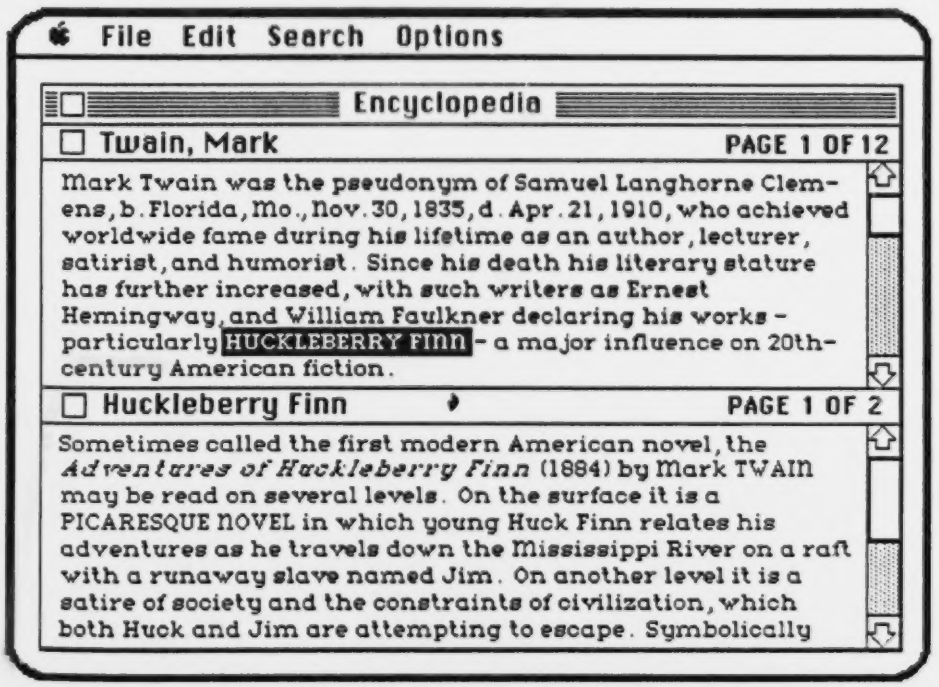
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Encyclopedia
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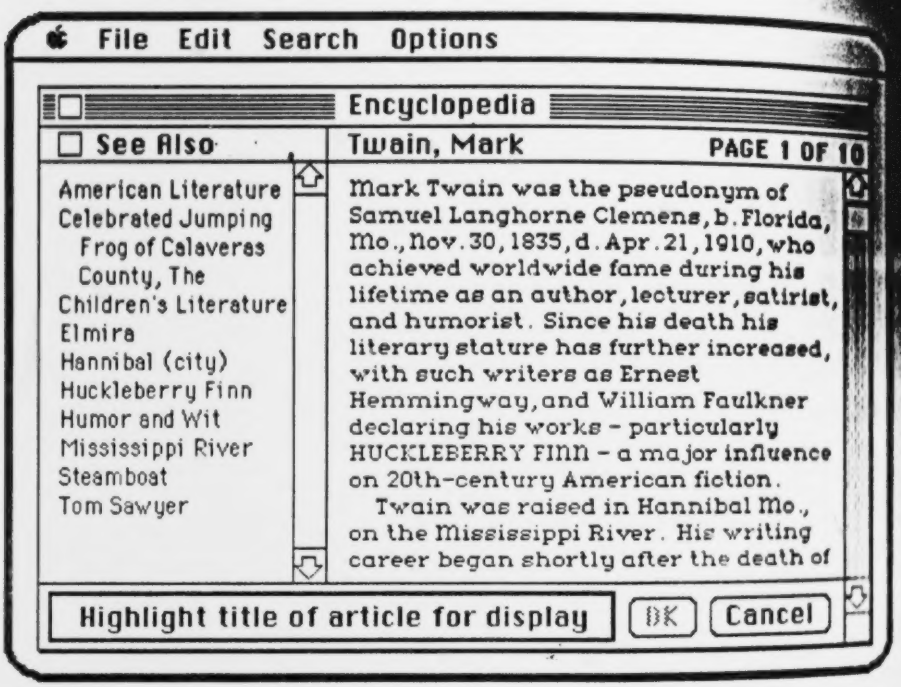
Huckleberry Finn
PAGE 1 OF 2
Sometimes called the first modern American novel, the *Adventures of Huckleberry Finn* (1884) by Mark TWAIN may be read on several levels. On the surface it is a PICARESQUE NOVEL in which young Huck Finn relates his adventures as he travels down the Mississippi River on a raft with a runaway slave named Jim. On another level it is a satire of society and the constraints of civilization, which both Huck and Jim are attempting to escape. Symbolically

Selecting "See Also" from the Options menu creates a listing of all the titles of other articles in the encyclopedia that the author or editor has identified as being of particular relevance to Mark Twain (Fig. 8). Each of the articles listed can be displayed by highlighting the article title.

Figure 8


File Edit Search Options
Encyclopedia
See Also
Twain, Mark
PAGE 1 OF 10
American Literature
Celebrated Jumping Frog of Calaveras County, The
Children's Literature
Elmira
Hannibal (city)
Huckleberry Finn
Humor and Wit
Mississippi River
Steamboat
Tom Sawyer
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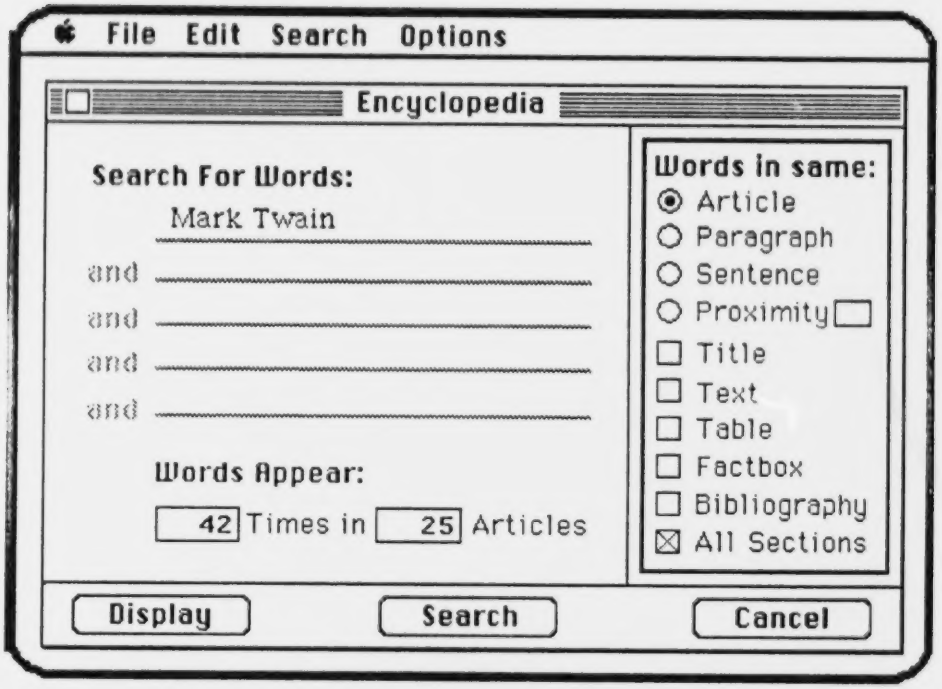
Twain was raised in Hannibal Mo., on the Mississippi River. His writing career began shortly after the death of
Highlight title of article for display
OK
Cancel

Another method for accessing information on Mark Twain would be to use the computer to search for every single occurrence of his name. Having established the particular search parameters (listed in the "dialog box" on the right side of the screen in Figure 9), the search reveals that the words "Mark Twain" appear 42 times in the data base, in 25 articles. A list of the articles can be displayed (Fig. 10) and any article selected (Fig. 11). The list of titles can be removed or redisplayed in the same way as the Contents and See Also listings described earlier.


File Edit Search Options
Encyclopedia
Search For Words:
Mark Twain
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Words Appear:
42 Times in 25 Articles
Words in same:
Article
Paragraph
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Title
Text
Table
Factbox
Bibliography
All Sections
Display
Search
Cancel

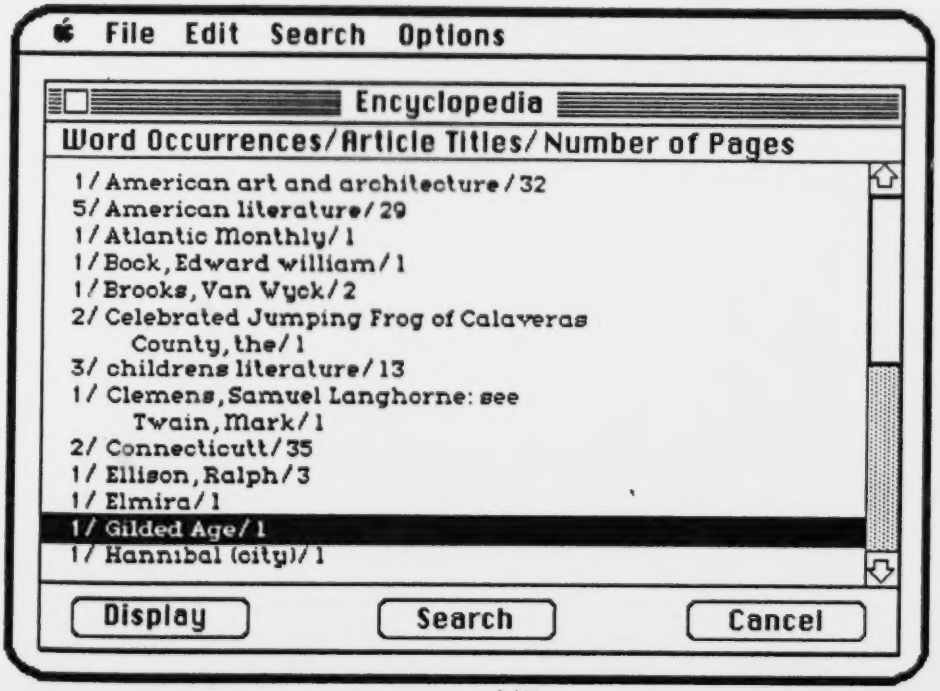
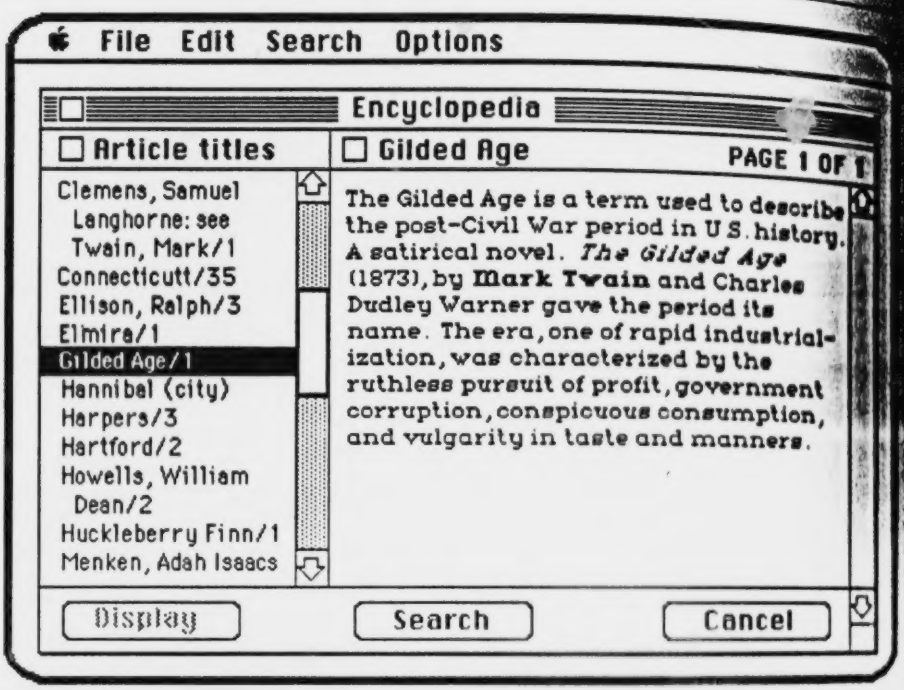
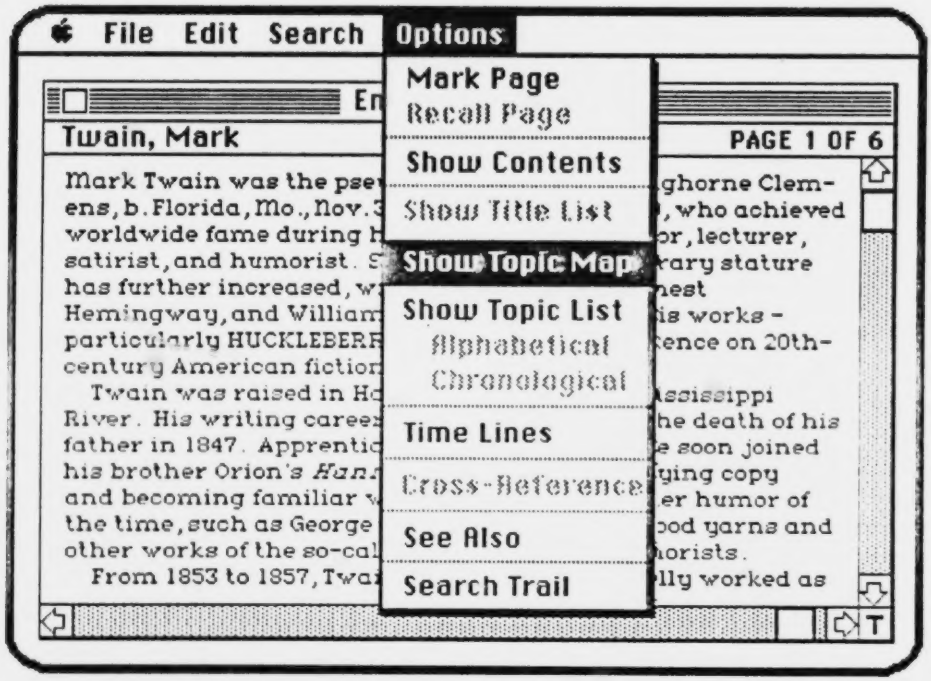

File Edit Search Options
Encyclopedia
Word Occurrences/Article Titles/Number of Pages
1/American art and architecture/32
5/American literature/29
1/Atlantic Monthly/1
1/Bock, Edward william/1
1/Brooks, Van Wyck/2
2/Celebrated Jumping Frog of Calaveras County, the/1
3/childrens literature/13
1/Clemens, Samuel Langhorne: see Twain, Mark/1
2/Connecticutt/35
1/Ellison, Ralph/3
1/Elmira/1
1/Gilded Age/1
1/Hannibal (city)/1
Display
Search
Cancel

Figure 11


File Edit Search Options
Encyclopedia
Article titles
Gilded Age
PAGE 1 OF 1
Clemens, Samuel Langhorne: see Twain, Mark/1
Connecticutt/35
Ellison, Ralph/3
Elmira/1
Gilded Age/1
Hannibal (city)
Harpers/3
Hartford/2
Howells, William Dean/2
Huckleberry Finn/1
Menken, Adah Isaacs
The Gilded Age is a term used to describe the post-Civil War period in U.S. history. A satirical novel, The Gilded Age (1873), by Mark Twain and Charles Dudley Warner gave the period its name. The era, one of rapid industrialization, was characterized by the ruthless pursuit of profit, government corruption, conspicuous consumption, and vulgarity in taste and manners.
Display
Search
Cancel

Information can also be searched for and displayed topically, using several different options. The "Show Topic Map" option listed on the menu (Fig. 12) allows the user to view a diagrammatic representation of a topic area (Figs. 13 and 14), which reveals the underlying hierarchical structure of the topic and the relative position of articles within that hierarchy. In this example, the Twain article is related to a series of topical groupings under the broad category of American Literature, which in turn is subordinated to a still wider grouping that encompasses all of the arts.


File Edit Search Options
Mark Page
Recall Page
Show Contents
Show Title List
Show Topic Map
Show Topic List
Alphabetical
Chronological
Time Lines
Cross-References
See Also
Search Trail
Twain, Mark
PAGE 1 OF 6

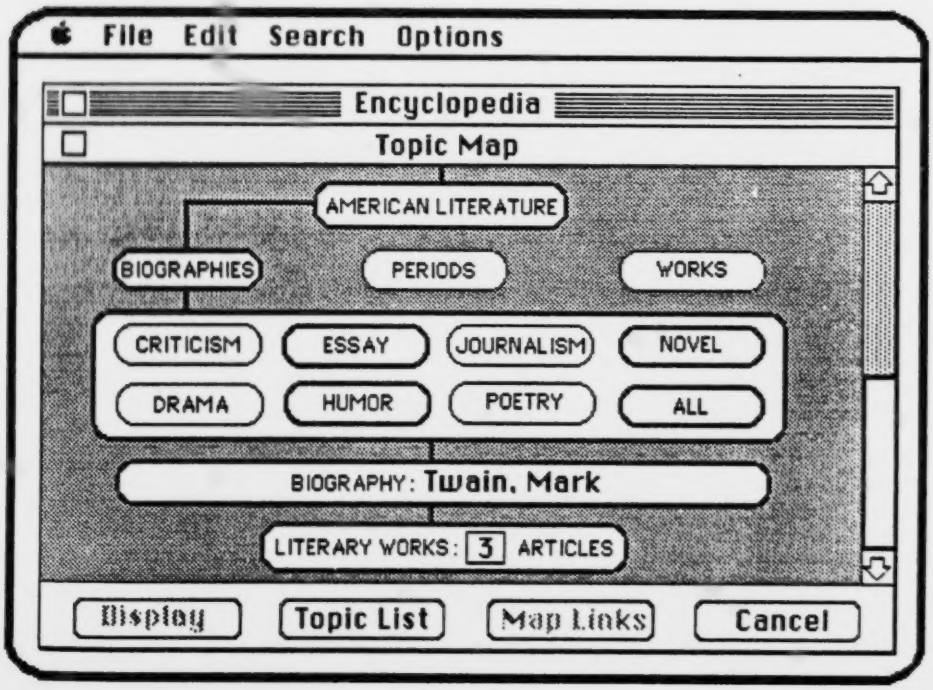
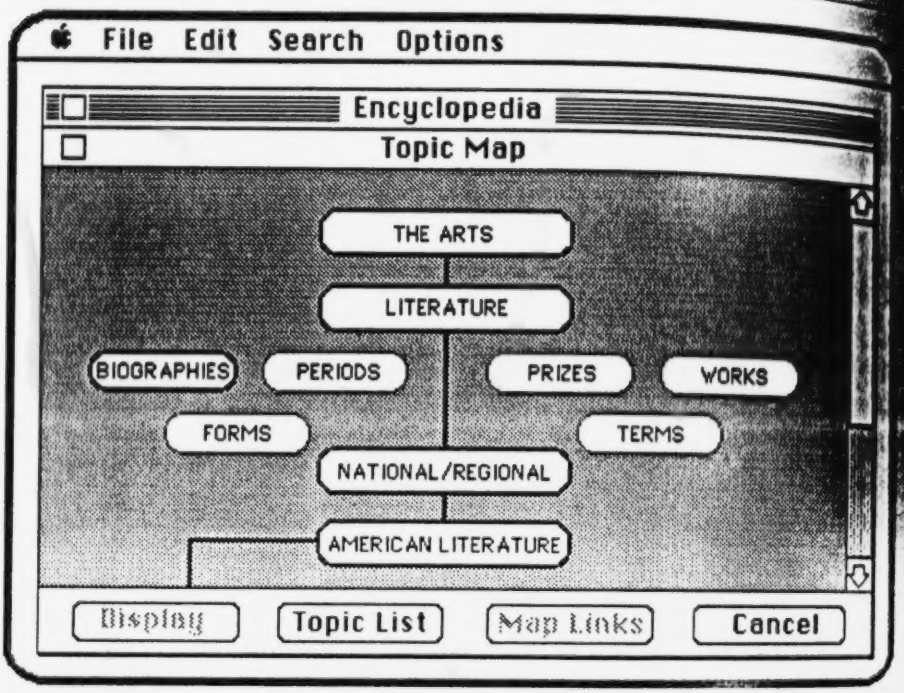
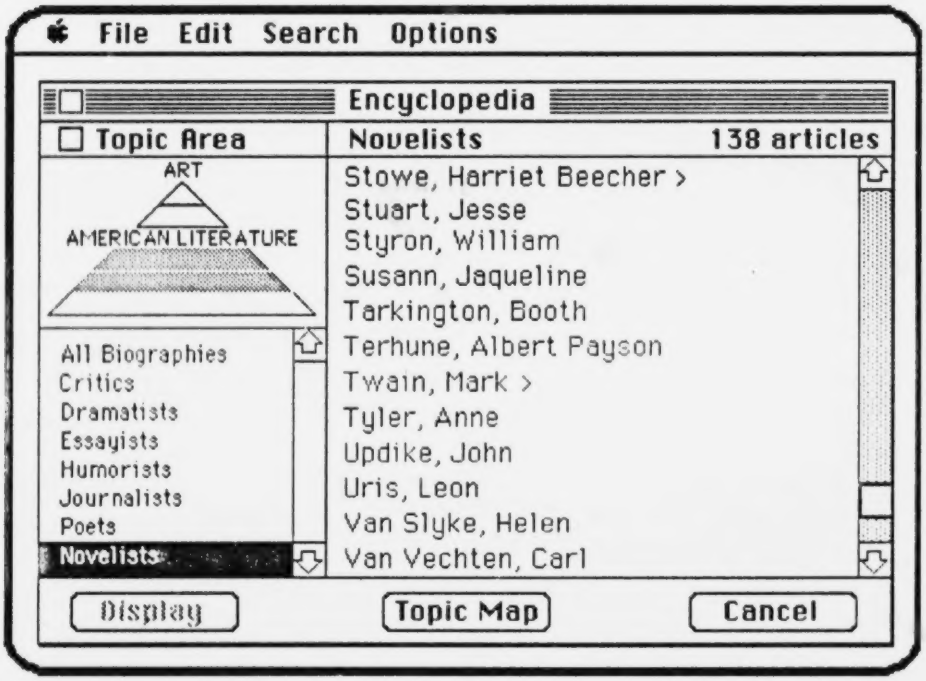

File Edit Search Options
Encyclopedia
Topic Map
AMERICAN LITERATURE
BIOGRAPHIES
PERIODS
WORKS
CRITICISM
ESSAY
JOURNALISM
NOVEL
DRAMA
HUMOR
POETRY
ALL
BIOGRAPHY: Twain, Mark
LITERARY WORKS: 3 ARTICLES
Display
Topic List
Map Links
Cancel

Figure 14



As the Options menu in Figure 12 indicates, topical information can also be viewed in a list form, in which the computer displays a predefined list of topically related articles. In the example shown (Fig. 15), Twain is listed in the context of other American novelists, but the article could also be viewed in the context of other categories of American writers, such as humorists or essayists. (In this example the pyramid icon in the top left corner represents the layers of hierarchy, with the levels that are currently being displayed shown in a highlighted form. Other levels can be selected by clicking directly on the icon.)



The alphabetical topic list in Figure 15 can also be displayed in a chronological sequence by selecting that option from the menu. The resulting display (Fig. 16) lists Twain and other American novelists in a chronological sequence, ordered by birth date—revealing at a glance Twain's contemporaries. Any article title listed can be selected and the text viewed, subordinating the listing to the window on the left side of the screen.

One final example continues the chronological theme but places Twain in a broader context. When the "Time Lines" option is selected from the menu shown in Figure 12, a diagrammatic representation is displayed, showing a period of time that coincides with the part of Twain's life (Fig. 17). In this example, the time line selected reveals key U.S. political events during a 30-year period of the 19th century. Other years, periods, or centuries can be selected using the horizontal scroll bar, and several different time-line options are available so that Twain (or any other individual or event) can be viewed in different contexts: from the point of view of political events, technological achievements, key events in the arts, and so forth. All of the events and individuals listed in the time line relate to articles in the encyclopedia. For example, the article "Mexican War" could be displayed by clicking directly on those words.

Figure 16

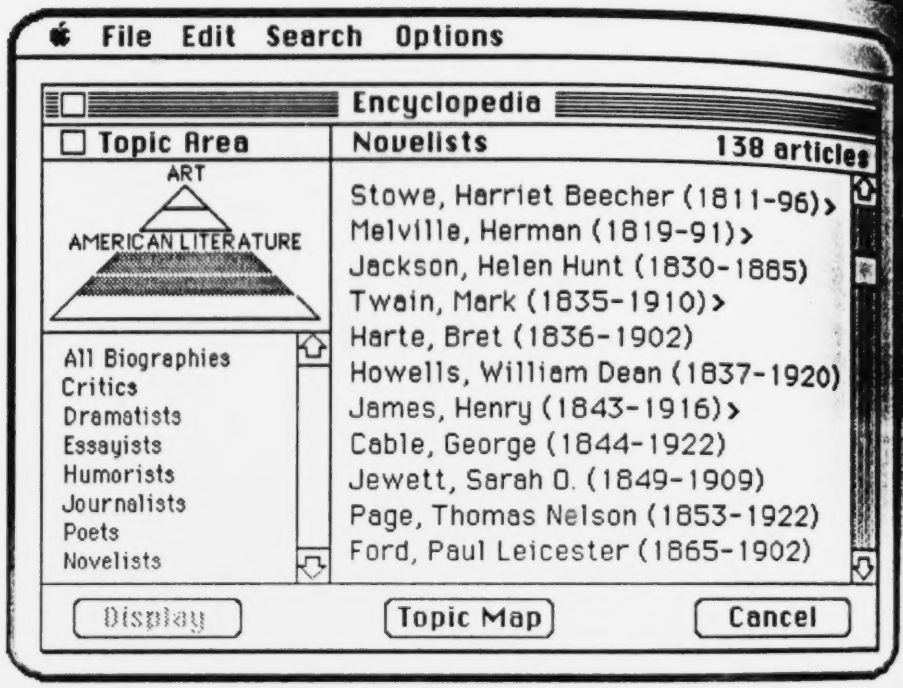
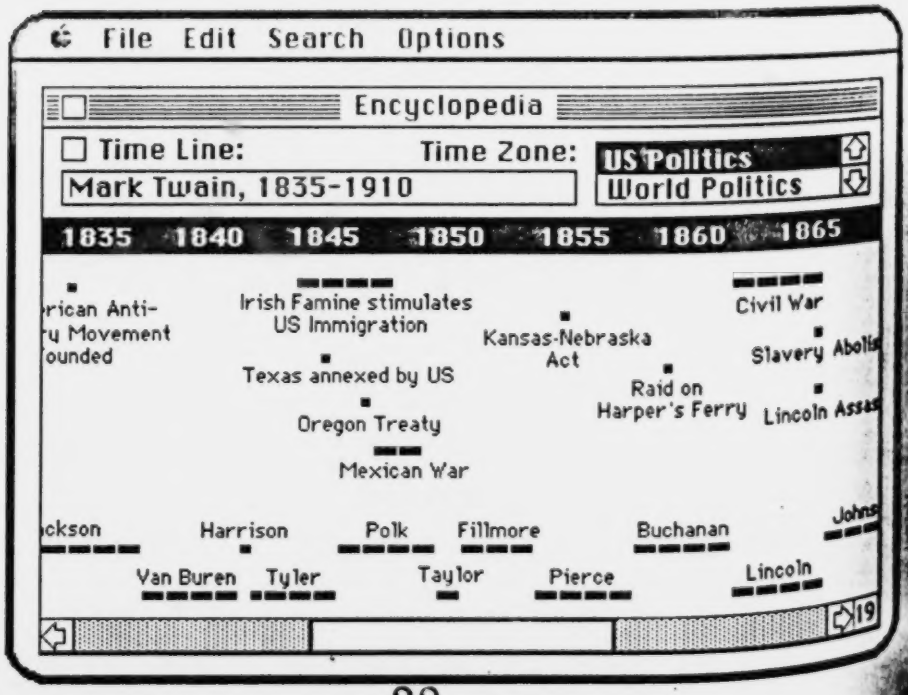


Figure 17



The purpose of showing and describing this series of examples (and I should emphasize that these screens represent a concept and not a commercially available product) is to reveal some of the many ways that a basic body of information could be linked, organized, and displayed. As I hope the Twain example reveals, it is possible to build a cognitive network and a navigational method that allows the user to approach an information inquiry from many different viewpoints, and provides a vehicle for truly dynamic exploration of the the data base's contents *and* its underlying structure.

Other research work that Grolier is conducting is examining how best to link different data bases (such as the dictionary and thesaurus shown in the first figure of this sequence) and how to provide the user with easy and effective methods of manipulating and extracting information so that it can be used in a convenient form. All of these efforts have one single thrust—to enhance the value of our encyclopedic information, thereby providing a more useful, more valuable information tool—a dynamic encyclopedia that has been shaped to take *full* advantage of the technologies described earlier.

Text Today, Multimedia Tomorrow: Planning an Audiovisual Data Base

All of the work described so far has dealt with the development and enhancement of a text data base, but as I mentioned earlier, Grolier is also planning to develop a complementary audiovisual data base that will eventually merge with the text, forming a multimedia product. We had a head start with the text data base because the AAE already existed in machine-readable format and the development cost for the encyclopedia was primarily offset against the print edition. This is not the case with an audiovisual data base, because we have to start from scratch.

Two years ago, Grolier funded a pilot project to test the feasibility of using laser videodisc technology as the delivery medium for an audiovisual data base. The resulting videodisc prototype was a vehicle for examining the questions regarding contents and production dimensions that are involved with creating a viable videodisc series. Though the research was worthwhile, it revealed the enormous complexity and cost involved in creating an encyclopedic audiovisual data base. Nevertheless, our planning and research activities have continued, and have in fact intensified considerably in the light of renewed interest in the videodisc as well as the recent announcement of CDI (compact disc interactive), a new audiovisual medium.

There are several distinct areas of audiovisual enhancement that we believe are valid for encyclopedia applications, including the use of audio, dynamic graphics, picture data bases, and full-motion film and video materials. The following paragraphs describe some of the potential audiovisual enhancements that we are investigating.

Audio Enhancement

Audio has many uses: music can best convey the essence of the works of composers and musicians, and what better way to describe a musical instrument than through the sound it makes? The use of recorded speeches is another interesting area; biographies of figures such as John F. Kennedy, Martin Luther King, Winston Churchill, and even Adolf Hitler can be brought alive through the vital quality of their speeches.

Dynamic Graphics

There are many kinds of graphics that can convey information in a much more meaningful way when they are dynamically controlled by the user. For example, historical maps can actually show the ebb and flow of history for subjects such as the rise and fall of the Roman Empire, the U.S. Civil War, Colonial Africa, and so forth. The rate at which events occur could be controlled by the user, as could the layers of detail that appear on the maps. Events and places listed on the maps could in turn be linked to text articles, and so on.

Other kinds of dynamic graphics include diagrams that illustrate different principles and concepts, such as how an internal-combustion engine works, the structure of the human eye, and how an aircraft flies. Again, each of these diagrams could allow for some degree of user interaction so that the underlying principles are better understood.

Picture Data Bases

Our encyclopedia application will contain many different image data bases in such areas as art, plants and animals, and peoples and countries. Each image in the data base can have certain attributes assigned so that the images can be reorganized to suit the needs of the user. For example, a data base of paintings might be viewed alphabetically by artist, or by date, region, media, style, period, or category (such as landscape or portraiture).

Motion Sequences

Motion can be used in many different ways: for example, movie and TV newsreels can show momentous historical events, such as the first moon walk; nature films can reveal the beauty of a humpback whale breaching, the speed of the cheetah, the elaborate mating displays of birds; and so on. Motion can also convey the complexities of sports activities that are impossible to describe through words or static images.

These examples show some of the ways in which we plan to use audiovisual materials. It is also our ultimate goal to build dynamic links between images, and between images and text—in much the same way as was shown in the Twain examples—that will allow the user to search for illustrations, and reorganize and manipulate them, in as many ways as possible. From our perspective, that is part of the ultimate appeal of multimedia technology—creating a truly flexible, dynamic medium that combines the stimulation and power of audiovisual information, the depth of layered text information, and the dynamic capabilities of the computer to manipulate both kinds of information.

In concluding, I want to reaffirm Grolier's commitment to keep pace with and use viable new information-delivery technologies. At the present time, multimedia technology is a promise, not a reality. That it will happen, we have no doubt; that it will be important to the educational community and other broader markets, we have no doubt. It is the when, and the how, that we cannot predict with the same degree of certainty.

Peter Cook

Peter Cook is the Vice President for Creative Services for Grolier Electronic Publishing, Inc. After 10 years of international publishing experience in London, he came to the U.S. specifically to help develop the original print edition of the Academic American Encyclopedia. Since the printed edition was published in 1980, he has served a key role in the development of the various electronics editions of the encyclopedia (using on-line data base distribution, videodisc, and CD-ROM technology) and has recently returned to London to work on the development of a CDI (compact disk interactive) version of the encyclopedia. As a trained graphic designer, he is particularly interested in the graphic representation of the knowledge structure of large data bases, and in the integration of text and graphics media.